



SLOVENSKI STANDARD
SIST EN 381-10:2003
01-januar-2003

JUfcj UbUcVY_UnUi dcfUWb_Yfc b]` j Yf]yb]` yU` !'%"XY` DfYg_i gbUa YrcXUnU
ý]fb_Yn[cfb^Y[UXYUH^YgU

Protective clothing for users of hand-held chainsaws - Part 10: Test method for upper body protectors

Schutzkleidung für die Benutzer von handgeführten Kettensägen - Teil 10: Prüfverfahren für Oberkörperschutzmittel

Vêtements de protection pour utilisateurs de scies à chaîne tenues à la main - Partie 10: Méthode d'essai pour vestes de protection

iteh STANDARD PREVIEW
(standards.iteh.ai)
<https://standards.iteh.ai/catalog/standards/sist/ce94d098-9fa3-42b5-ac53-40d3e6de1363/sist-en-381-10-2003>

Ta slovenski standard je istoveten z: EN 381-10:2002

ICS:

13.340.10 Varovalna obleka Protective clothing

SIST EN 381-10:2003 en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 381-10:2003

<https://standards.iteh.ai/catalog/standards/sist/ce94d098-9fa3-42b5-ac53-40d3e6de1363/sist-en-381-10-2003>

ICS 13.340.10

English version

**Protective clothing for users of hand-held chainsaws - Part 10:
Test method for upper body protectors**

Vêtements de protection pour utilisateurs de scies à chaîne
tenues à la main - Partie 10: Méthode d'essai pour vestes
de protection

Schutzkleidung für die Benutzer von handgeführten
Kettensägen - Teil 10: Prüfverfahren für
Oberkörperschutzmittel

This European Standard was approved by CEN on 1 August 2002.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

[SIST EN 381-10:2003](https://standards.iteh.ai/catalog/standards/sist/ce94d098-9fa3-42b5-ac53-40d3e6de1363/sist-en-381-10-2003)

<https://standards.iteh.ai/catalog/standards/sist/ce94d098-9fa3-42b5-ac53-40d3e6de1363/sist-en-381-10-2003>



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents

	page
Foreword.....	3
Introduction	4
1 Scope	4
2 Normative references	4
3 Terms and definitions.....	5
4 Test methods.....	5
4.1 General.....	5
4.2 Number of test specimens	6
4.3 Sizes of test specimens	6
5 Pre-treatment.....	6
6 Testing for dimensional change.....	6
7 Checking of protective coverage	7
8 Testing of resistance to cutting.....	7
8.1 Purpose of testing	7
8.2 Test specimens	7
8.3 Marking of positions for cutting.....	8
8.3.1 Test position on shoulder	8
8.3.2 Test position on the sleeve.....	8
8.3.3 Test positions if there are seams in the protective material.....	8
8.4 Test mounts.....	8
8.4.1 Shoulder test mount	8
8.4.2 Sleeve test mount	8
8.5 Apparatus	8
8.6 Mounting of test specimens	9
8.6.1 Shoulder test	9
8.6.2 Sleeve test	9
8.7 Test procedure	9
8.7.1 Positions of cuts	9
8.7.2 Number of cuts.....	10
9 Testing of attachment of protective material	10
9.1 General.....	10
9.2 Test specimens	10
9.3 Apparatus	10
9.4 Test procedure	10
10 Ergonomic testing	11
10.1 Water vapour resistance	11
10.2 Ergonomic assessment.....	11
10.3 Procedures	11
11 Test report	12
Annex ZA (informative) Clauses of this European Standard addressing essential requirements or other provisions of EU Directives	16
Bibliography	17

Foreword

This document (EN 381-10:2002) has been prepared by the Technical Committee CEN /TC 162, "Protective clothing including hand and arm protection and lifejackets", the Secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2003, and conflicting national standards shall be withdrawn at the latest by April 2003.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative annex ZA, which is an integral part of this document.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 381-10:2003

<https://standards.iteh.ai/catalog/standards/sist/ce94d098-9fa3-42b5-ac53-40d3e6de1363/sist-en-381-10-2003>

Introduction

This European Standard forms part of a series concerned with personal protective equipment designed to protect against the risks arising from the use of hand-held chainsaws.

Accidents occur due to a number of complex reasons, but a common factor is incorrect use of the chainsaw. The importance of correct training and proper use of a chainsaw in preventing accidents cannot be underestimated.

In some countries chainsaw users adopt working practices, which together with training makes the use of chainsaw protective upper body protectors unnecessary. These usually include the instruction to hold the chainsaw with both hands and to use the chain brake if it becomes necessary to stop cutting. It is often found that for ergonomic reasons it is impractical to protect the upper body.

All parts of the upper body have been shown to be at risk when using a chainsaw.

In this European Standard, specifications for the protective coverage and performance of the upper body protectors are given. No personal protective equipment can ensure a 100% protection against cutting from a hand-held chainsaw.

Nevertheless, experience has shown that it is possible to design personal protective equipment, that offers a certain degree of protection.

Different functional principles may be applied in order to give protection.

These include:

- a) chain slipping: on contact the chain does not cut the material
- b) clogging: fibres are drawn with the chain into the drive sprocket and block chain movement
- c) chain braking: fibres have a high resistance to cutting and absorb rotational energy, thereby reducing the chain speed.

Often more than one principle is applied in chainsaw protective clothing. Upper body protectors meeting this standard are meant to be used by users working off the ground and where risk assessment shows that there is a significant risk to be cut by the moving chain on the upper part of the body such as when working from a sky lift and carrying out tree surgery.

1 Scope

This European Standard, part 10, specifies the procedures for sampling and pre-treatment of upper body protectors intended to provide protection against cutting by hand-held chainsaws, the measurement of the protective coverage, the apparatus and test methods for assessing resistance to cutting, and the practical performance test for evaluating ergonomic properties in relation to part 11 of this standard

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 381-1:1993, *Protective clothing for users of hand-held chainsaws — Part 1: Test rig for testing resistance to cutting by a chainsaw.*

EN 381-3:1996, *Protective clothing for users of hand-held chainsaws — Part 3: Test methods for footwear.*

EN 381-11:2002, *Protective clothing for users of hand-held chainsaws — Part 11: Requirements for upper body protectors.*

EN ISO 3175:1995, *Textiles — Determination of dimensional change on dry cleaning in perchloroethylene — Machine method.* (ISO 3175:1995)

EN ISO 6330:2000, *Textiles — Domestic washing and drying procedures for textile testing* (ISO 6330: 2000)

EN ISO 13934-2:1999, *Textiles — Tensile properties of fabrics — Part 2: Determination of maximum force using the grab method* (ISO 13934-2:1999)

EN 31092:1993, *Textiles — Determination of physiological properties — Measurement of thermal and water-vapour resistance under steady-state conditions (sweating guarded — hotplate test)* (ISO 11092:1993)

3 Terms and definitions

For the purposes of this European Standard, the following terms and definitions apply:

3.1

front (of an upper body protector)

part of a garment covering the forward 50% of the upper body circumference.

3.2

rear (of an upper body protector)

part of a garment covering the rear 50% of the upper body circumference.

NOTE Depending upon design and construction, and due to many layers of protective material, it may be difficult to establish the division between the front and the rear of an upper body protector. It is nevertheless of great importance to establish this before pre-treatment and testing.

3.3

protective material

material which is designed to protect the wearer against the cutting effect of a hand-held chainsaw. This protective material may include the cloth of the garment.

3.4

unit of protective material

cut out piece or panel of protective material consisting of all the fabric or other layers that constitute the protective material that go into the construction of a garment. A unit has no seams or joins within it. Units may be joined together to provide the complete protective coverage required, before insertion and attachment to garments, but such units retain their individuality for testing purposes.

4 Test methods

4.1 General

Measuring instruments unless otherwise specified shall be accurate to $\pm 2\%$ of the pass/fail level of the characteristic being measured.

For each of the required sequences of measurements performed in accordance with this standard a corresponding estimate of the uncertainty of the final result shall be determined. This uncertainty (U_m) shall be given in the test report in the form $U_m = \pm X$. It shall be used in determining whether a "Pass" performance has been achieved. If

the final result minus U_m is below the pass level when the requirement that a certain value shall be exceeded, the sample shall be deemed to have failed.

4.2 Number of test specimens

A set of test specimens shall be supplied that is sufficient to complete all the tests. Note that if two types of pre-treatments are specified, the testing and the numbers of test specimens is effectively doubled and two sets are required. Test specimens which have been used to assess dimensional stability and protective coverage may be used for cut-testing if it has not been necessary to cut them up for these measurements.

The number of garments required for cut testing depends on the number of units of protective material present within them and whether there are any joins or seams between different protective material units such as between the body and the sleeve. Only one test cut shall be carried out on each unit of protective material. Therefore at least three garments are required for cut testing if the design includes a fastening down the centre front of the garment, but no seams between the protective material on the body and in the sleeve. For a design incorporating only one unit of protective material, six garments are required for cut testing.

4.3 Sizes of test specimens

Whenever possible test specimens shall be of a size to fit users with chest girths of 108 to 112 cm.

5 Pre-treatment

Except in the specific cases detailed below, all the test specimens shall be washed and dried five times before testing.

Test specimens shall be washed according to EN ISO 6330:2000, procedure 2 A. After each wash cycle the test specimen shall be dried according to EN ISO 6330:2000, procedure E (temperature not to exceed 70 °C). If the upper body protectors are marked as unsuitable for tumble-drying, the test specimens shall be line-dried after each wash cycle according to EN ISO 6330:2000, procedure A.

Exceptions and additions to this treatment shall be made in the following cases:

- a) Where the upper body protectors are marked as unsuitable for washing, but suitable for dry-cleaning.

In such cases, the test specimens shall be dry-cleaned five times before testing. In principle the dry-cleaning shall be performed in accordance with the conditions described in 9.1 "Process for normal materials" of EN ISO 3175:1995 i. e. using conditioned test specimens, perchlorethylene with surfactant, addition of emulsified water, cleaning for 15 min at (30 ± 3) °C, draining and extracting, rinsing for 5 min with pure solvent, and draining and final extraction, followed by tumble drying with an outlet temperature not exceeding 60 °C. No restorative finishing procedure shall be applied.

Where the test specimens are marked as suitable for both washing and dry-cleaning.

One set of test specimens shall be washed and dried five times and one set of test specimens shall be dry cleaned five times.

- b) Where the manufacturer specifies different washing or cleaning procedures these shall be used in preference to those above.

6 Testing for dimensional change

One upper body protector shall be tested by each pre-treatment applicable.

It shall be subjected to five pre-treatment cycles according to clause 5 of this standard.

After the completion of each cycle, the upper body protectors shall be reshaped by hand, but not reshaped by ironing.

The dimensions of the protective material coverage shall be measured before the first pre-treatment cycle and on completion of last cycle of the pre-treatment procedure. The dimensional change shall be determined from the percentage difference between the measurements made before the pre-treatment and the measurements made after the pre-treatment.

Measurements shall be carried out in two directions, at right angles to the other. It is suggested that one measurement should be the length of the protective material from cuff to cuff, or cuff to the centre of the garment. The other measurement is then appropriately the length of the protective material from the bottom edge near the centre front, up to the top edge at the collar and similarly on the back.

While measuring the dimensions the garment shall be stretched with a force of (20 ± 2) N in the direction of the dimension being measured. Clamps may be attached to the part of the garment to which the protective material is attached, except at the cuff where the clamps shall be attached to the protective material.

7 Checking of protective coverage

The coverage shall be measured on the pre-treated test specimen used for the testing of dimensional change.

The following procedure is one way to carry this out. Cut out any non-protective lining. Lay the garment out flat, front side uppermost on a flat surface such as a table top. Smooth out any wrinkles and creases and ensure that any fastening present lies down the centre of the garment. On the outer material mark a line along the top of the shoulder and top and bottom of the sleeve. If there is no front fastening, mark a line down the centre front of the garment. Carefully and with minimal disturbance of the garment, mark lines on the inside surface of the protective material of the garment, corresponding to the top of shoulder and the top and bottom of the sleeves.

Take the garment and turn it inside out.

[SIST EN 381-10:2003](https://standards.iteh.ai/catalog/standards/sist/ce94d098-9fa3-42b5-ac53-)

<https://standards.iteh.ai/catalog/standards/sist/ce94d098-9fa3-42b5-ac53->

Measure the area that is covered with protective material and check that the requirements given in 4.4 in EN 381-11:2002 are fulfilled.

For some types of upper body protective jackets such as those that cannot be turned inside out, the test house will have to check that the requirements are fulfilled using a method suitable for that particular product. It will probably be necessary to expose the protective material by cutting away most of the outer of the garment while not disturbing the arrangement of protective material units.

8 Testing of resistance to cutting

8.1 Purpose of testing

The purpose of this test is to assess the resistance of the upper body protector to cutting by a chainsaw under such conditions that the garment is restrained from twisting when contacted by the moving chain.

8.2 Test specimens

The number of test specimens required for cut testing depends on the design of the protective material units constituting the required protective coverage, and the positions of seams between units of protective material (see 4.1 of this standard).

All cut test specimens shall have been pre-treated according to clause 5.

Where the garments are marked as suitable for both washing and dry cleaning two sets of garments shall be tested.